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THE
ONTARIO WATER RESOURCES
COMMISSION
WATER POLLUTION SURVEY
OF THE
VILLAGE OF LAKEFIELD
COUNTY OF PETERBOROUGH

1964

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THE
ONTARIO WATER RESOURCES
COMMISSION

Report on
WATER POLLUTION SURVEY

of the
VILLAGE OF LAKEFIELD

in the
COUNTY OF PETERBOROUGH

Division of Sanitary Engineering

August 25, 1964

Report on
WATER POLLUTION SURVEY
of the
VILLAGE OF LAKEFIELD

<u>INDEX</u>	<u>PAGE NUMBER</u>
Introduction	1
Interviews with Officials	1
Village of Lakefield	1
Otonabee River at Lakefield	2
Water Uses	2
Water Supply	3
Surface Water Drainage	3
Sanitary Waste Disposal	4
Proposed Sewage Works	5
Industry	6
Private Outfalls	7
Sampling Procedure	7
Interpretation and Significance of Laboratory Results	7
Sample Results	8
Summary	9
Recommendations	10

APPENDICES

Laboratory Results
Map of the Village of Lakefield

WATER POLLUTION SURVEY

of the

VILLAGE OF LAKEFIELD

INTRODUCTION

A water pollution survey of the Village of Lakefield was performed by Commission staff on August 25, 1964. Surveys of this type are made by the Division of Sanitary Engineering, Ontario Water Resources Commission, in order to locate active and potential sources of surface water pollution. Recommendations are made concerning the abatement of conditions which adversely affect water quality.

A similar survey was made previously at Lakefield by Commission staff on March 30, 1962. Therefore, this latter survey was performed to review conditions revealed previously and to ascertain if progressive action is being taken to provide municipal sewage treatment works for the village.

INTERVIEWS WITH OFFICIALS

A discussion was held on August 25, 1964, with Mr. H. T. Hill, Clerk-Treasurer of Lakefield. An unsuccessful attempt was made to contact Dr. H. E. Gastle, Medical Officer of Health.

VILLAGE OF LAKEFIELD

Lakefield is located approximately nine miles north of the City of Peterborough on Highway 28. According to the 1964 Municipal Directory, the population is approximately 2,200. The area of the village is approximately 644 acres.

The Otonabee River flows in a southerly direction through the municipality. The greater area of the village, as well as the

principal commercial section, lies on the east side of the river.

OTONABEE RIVER AT LAKEFIELD

The Otonabee River is a link in the Trent Canal system, and one of the associated locks is located at Lakefield. The drainage area of the river upstream from the village is 2,840 square miles.

Hydrologic data pertaining to the Otonabee River at Lakefield have been obtained from the Water Resources Branch, Department of Northern Affairs and National Resources. According to the information supplied from this source, the following data pertaining to the year ending on September 30, 1963, are of interest with respect to the river at Lakefield:

<u>Flows (cubic feet per second)</u>		<u>Date</u>
Maximum	- 6,460	April 5, 1963
Minimum	- 624	October 22, 1962
Mean	- 2,300	-- -- -- --

WATER USES

Municipal

The Otonabee River is the source of the municipal water supply at Lakefield, with the water purification plant being located on the east bank of the river upstream from the developed part of the village.

Industrial

Industrial use of the Otonabee River at Lakefield is not appreciable.

Recreational

Extensive use is made of the river at Lakefield for recreational purposes. Numerous watercraft pass through the

Trent Canal system every year. A popular bathing area is located on the peninsula in the northern part of the village where the waters of Katchiwano Lake flow through a narrows into the Otonabee River. Fishing also is popular in these waters.

WATER SUPPLY

The municipal water purification plant is located near the river bank at the northern extremity of Concession Street. The water works intake extends into the river for a distance of approximately 50 feet. The treatment works provide coagulation, sedimentation, filtration and chlorination.

A reservoir is located in the system and provides storage for approximately 118,000 gallons of water.

SURFACE WATER DRAINAGE

Surface run-off flows drain to the Otonabee River.

The principal storm sewer system in Lakefield has its outlet on the east bank of the river at the foot of Queen Street.

Two drainage courses receive surface water flows in the central part of the village and empty into the Otonabee River at its east bank between Nichols Street and Dublin Street.

A drainage ditch terminates on the east bank of the river on the north side of Block Road at the southern limit of the village.

A small watercourse which assumes the features of a marsh extends from the north-western part of Lakefield to Katchiwano Lake. Various inspections of this marshy area have revealed insufficient flows for sampling.

SANITARY WASTE DISPOSAL

The provision of adequate private sewage disposal systems in Lakefield has been somewhat difficult due to the local geological conditions. Shallow overburden overlies a limestone formation.

In the commercial part of the eastern section of the village, sewage flows are discharged from many premises to the municipal storm sewer system. Reportedly, private sub-surface sewage disposal systems are utilized extensively in outlying parts of the village with some problems occurring due to malfunctioning systems.

Problematic septic tank systems are experienced at the Lakefield Public School and at the Lakefield District High School. Due to the significance of these conditions, the premises are described as follows:

Lakefield Public School

As shown on the appended map, the old and the new premises of the Lakefield Public School are located on Ermatinger Street in the eastern part of the municipality. It has been reported to Commission staff on several occasions that sanitary waste from the tile bed system at the public school was gaining access to the municipal drainage course which empties into the Otonabee River at sampling point TO.100.86 D.

Lakefield District High School

This school is located on the south side of Bridge Street in the western part of the village. Reportedly, the associated septic tank system does not function adequately.

Sanitary waste rises frequently from the tile bed to the surface of the ground. The contents of the septic tank are removed regularly to relieve the hydraulic loading on the tile bed system. Reportedly, the surfacing waste does not gain access to any watercourse but could result in an objectionable environmental condition. It was impossible to inspect the adequacy of this system on August 25 because the scholastic year had not commenced.

According to information obtained during this survey, the anticipated student enrolment at the Lakefield District High School for the current year was approximately 575, with this figure to increase to 750 by 1969.

PROPOSED SEWAGE WORKS

During the past few years, the municipal officials at Lakefield engaged a firm of consulting engineers for the preparation of a preliminary report on the provision of sanitary sewers and sewage treatment works. Preliminary approval of this proposed construction project was granted by the Ontario Water Resources Commission. In order to satisfy the requirements of the Ontario Municipal Board, however, it has become obvious that modification of the original sewage works proposal is necessary.

Mr. H. T. Hill, Clerk-Treasurer, reported on August 25 that the present sewerage plan would provide service to a section of the village lying on the east side of the Otonabee River. The outline of this sewer area is shown on the appended map. The proposed area lies generally between Rabbit Street and the river, including the principal commercial section, part of

the concentrated residential area, with a sanitary sewer extension on Ermatinger Street to the public school premises. A proposed sewage pumping station would be located south of Nichols Street from whence a forcemain would deliver sewage flows to a conventional waste stabilization pond or a mechanically aerated lagoon to be constructed in the Township of Douro south of Lakefield. The effluent from this sewage treatment facility would be discharged to the Otonabee River downstream from the village.

It is regrettable to note that the modified sewerage system would not serve the Lakefield District High School.

INDUSTRY

Some of the principal industrial firms located in Lakefield are listed as follows:

<u>Name of Firm</u>	<u>Product</u>
Kingdon Lumber Company Limited	Building supplies
Lakefield Creamery and Dairy Limited	Dairy products
Lakefield Lumber	Building supplies
Lakefield Research of Canada Limited	Mineral Assayers
Rilco Industries Limited	Watercraft

In regard to the aforementioned industrial firms, only the Lakefield Creamery and Dairy Limited plant and the Lakefield Research of Canada Limited plant might be classified as premises where industrial waste flows are produced.

Industrial waste flows are discharged from the Lakefield Creamery and Dairy Limited plant to the municipal storm sewer system which terminates at the outlet on Queen Street at the river bank.

Reportedly, wastes of an undetermined nature are dis-

charged from the Lakefield Research of Canada Limited premises to a small lagoon which is located on or near the property. Overflows from this lagoon discharge to the ditch which terminates on the east bank of the Otonabee River at Block Road. This ditch was devoid of flow at the time of this survey.

PRIVATE OUTFALLS

Although waste outfalls from private premises might exist to some extent in Lakefield, such outfalls were not revealed during this survey.

SAMPLING PROCEDURE

Samples were collected from the waters of the Otonabee River in Lakefield, as well as from outfalls discharging thereto within the corporation boundaries. Appended to this report is a map showing the locations of sampling points. The pertinent laboratory results are attached also.

Seasonal weather conditions prevailed during this survey, with the maximum atmospheric temperature being approximately 70 to 75 degrees Fahrenheit.

INTERPRETATION AND SIGNIFICANCE OF LABORATORY RESULTS

The analyses employed to determine the quality of samples were: biochemical oxygen demand (BOD), solids, tests for anionic detergents as ABS, and the enumeration of coliform organisms.

The BOD of sewage, industrial wastes, or polluted waters, is the oxygen required during stabilization of the decomposable organic or chemical material by aerobic biochemical action. A five-day BOD determination with incubation at 20 degree Centigrade is reported. A high BOD is indicative of organic or chemical pollution. The BOD

of a watercourse should not exceed four parts per million (ppm)

The analyses for solids include tests for total, suspended, and dissolved solids. The results are reported in ppm. The first test measures both the solids in solution and in suspension. The suspended solids indicate the measure of undissolved solids of organic or inorganic nature in suspension. Land erosion, sewage, and industrial wastes are significant sources of suspended solids. The effect of suspended solids in water is reflected in difficulties associated with water purification, and deposition in streams which could interfere with the habitat of aquatic life. The undissolved solids are a measure of those solids in solution.

The presence of anionic detergents as ABS usually is an indication that domestic waste is contained in the sample.

The coliform count is employed to obtain an enumeration of coliform organisms. The presence of coliform indicates pollution by human or animal excrement, or by some non-faecal forms. The number of coliforms is reported per 100 millilitres (ml) of the sample. The membrane filter technique was used in the examination of these samples. It is the opinion of the OWRC that the presence of coliforms in a watercourse should not exceed 2,400 organisms per 100 ml of water.

SAMPLE RESULTS

The analyses and examination of samples were performed at the laboratory of the Ontario Water Resources Commission in Toronto. The laboratory results pertaining to the samples

collected on March 30, 1962, and on August 25, 1964, are tabulated and appended to this report.

Although the sewage flows from Lakefield are discharged to a watercourse which provides considerable dilution of these wastes, the coliform content of the river water increased between the upstream and downstream limits of the village.

High coliform contents were revealed in the samples collected from the flows in the two drainage courses and the Queen Street storm sewer, thus indicating the presence of untreated or inadequately treated sewage. A high BOD was revealed in the sample obtained from the Queen Street storm sewer outfall on March 30, 1962.

SUMMARY

A water pollution survey was performed at the Village of Lakefield on August 25, 1964, to review conditions which had been investigated previously on March 30, 1962.

In that part of Lakefield which lies east of the Otonabee River, sewage flows are discharged from numerous premises to two drainage courses and a municipal storm sewer system, the outfalls from which are located on the east bank of the river.

The local municipal officials have undertaken a programme to provide sewage treatment works for the village. It has become apparent recently, however, that the original proposals outlined by a firm of consulting engineers in its preliminary report on sewage works for the municipality might

require modification. According to information obtained during this survey, it has been suggested that the sewer area would be confined to a section of the eastern part of the village. This would not provide a sanitary sewer connection for the Lakefield District High School which is located in the western part of Lakefield. Reportedly, the private sewage disposal system employed at this school is inadequate and, with the anticipated increase in the enrolment of students, is likely to present a serious environmental problem in the future unless effective remedial action is taken to alleviate the condition.

RECOMMENDATIONS

The municipal officials at Lakefield are urged to continue their attempts to initiate a sewage works project for the village in order to abate the local sewage disposal problems.


In conjunction with the undertaking of even a reduced sewage works programme, attempts should be made to include a sanitary sewer extension to the Lakefield District High School.

All of which is respectfully submitted,

District Engineer:


J. K. Theil

Approved by:


K. H. Sharpe, Director *per 9/13*

/mh

VILLAGE OF LAKEFIELD

ALL SAMPLES EXCEPT PH REPORTED IN
PPM UNLESS OTHERWISE INDICATED

LABORATORY RESULTS PERTAINING TO SAMPLES COLLECTED FROM
THE OTONABEE RIVER AND OUTFALLS THERETO

SAMPLE POINT NO.	DATE OF SAMPLE	DESCRIPTION	5-DAY	SOLIDS			ANIONIC DETERGENTS	BACTERIOLOGICAL
			BOD	TOTAL	SUSP.	DISS.	AS ABS	EXAMINATION COLIFORMS /100 ML M.F.
T0.100.55	MAR.30/62	OTONABEE RIVER AT DOWNSTREAM LIMIT OF LAKEFIELD	2.2	124	--	--	--	600
	AUG.25/64		0.8	192	4	188	0.0	300
T0.100.55D		DITCH TERMINATING ON EAST BANK OF RIVER AT BLOCK ROAD		NO FLOW ON AUGUST 25, 1964				
T0.100.86D	MAR.30/62	DRAINAGE COURSE DISCHARGING TO EAST BANK OF RIVER NORTH OF DUBLIN ST.	2.1	264	4	260	--	1,800
	AUG.25/64		1.0	574	5	569	0.1	22,000
T0.100.88D	MAR.30/62	DRAINAGE COURSE DISCHARGING TO EAST BANK OF RIVER NORTH OF SAMPLING POINT T0.100.86D	4.6	588	26	562	--	7,000
	AUG.25/64		2.1	752	24	728	0.1	41,000
T0.101.18W	MAR.30/62	OUTFALL FROM QUEEN STREET STORM SEWER TO RIVER (SAMPLED AT MANHOLE ON RIVER BANK)	48.0	206	54	152	--	27,300,000
	AUG.25/64		0.7	162	6	156	0.0	69,100
T0.102.23	MAR.30/62	OTONABEE RIVER AT MUNICIPAL WATER PURIFICATION PLANT NEAR UPSTREAM LIMIT OF LAKEFIELD	1.9	142	--	--	--	116
	AUG.25/64		0.8	184	5	179	0.0	60